

CLAIMS

The invention claimed is

1. A termination block comprising:
 - a termination block base including:
 - a rear face having a rear aperture;
 - a front face having a front aperture, the front face being spaced from the rear face;
 - a plurality of mounting surfaces on the rear face;
 - a plurality of screw receiving portions, each positioned at one of the mounting surfaces and having an opening and a screw receiver extending from the rear face toward the front face; and
 - an interior space between the rear and front faces and accessible from the rear face through the rear aperture and accessible from the front face through the front aperture;
 - a plurality of screws, each extending through the opening of one of the screw receiving portions and threadably received in the screw receiver thereof; and
 - a lead frame of flat metal having a plurality of separate circuit portions and positioned at the rear face of the termination block base, each circuit portion including:
 - a terminal connection portion positioned at one of the mounting surfaces of the termination block base, each terminal connection portion having a screw aperture therethrough positioned in alignment with the opening of the screw receiving portion positioned at the mounting surface and one of the screws extending through the screw aperture;
 - a bent tine portion extending through the rear aperture of the rear face and positioned within the interior space of the termination block base and positioned for access through the front aperture, the bent tine portion having a contact end portion, the contact end portions of the bent tine portions of the plurality of circuit

portions being in spaced apart arrangement in position within the interior space of the termination block base; and

a trace member portion electrically coupling together the terminal connection portion and the bent tine portion.

2. The termination block of claim 1 wherein each of the plurality of screws has a head portion and the screw is threadably movable into the screw receiver of the screw receiving portion positioned at the mounting surface at which the terminal connection portion of the circuit portion is positioned to securely hold the terminal connection portion to the rear face of the termination block base.

3. The termination block of claim 1 further including a plug extending through the rear aperture of the rear face of the termination block base and within the interior space of the termination block base and holding the bent tine portions of the plurality of circuit portions in spaced apart arrangement.

4. The termination block of claim 3 wherein the plug has a plurality of channels, each having one of the bent tine portions of the plurality of circuit portions positioned therein.

5. The termination block of claim 4 wherein the plug holds the bent tine portions of the plurality of circuit portions in spaced apart, generally planar arrangement.

6. The termination block of claim 3 wherein the plug has a cover portion extending over a portion of the rear face of the termination block and covering at least a portion of the trace member portions of the plurality of circuit portions.

7. The termination block of claim 1 wherein the termination block base further includes rear raised portions positioned adjacent to the terminal connection portions of the plurality of circuit portions and extending from the rear face rearward beyond the terminal connection portions of the plurality of circuit portions.

8. The termination block of claim 7 wherein the termination block base further includes a plurality of forwardly projecting front support members, the front support members being positioned to engage at least a portion of the rear raised portions of another termination block when two termination blocks are positioned in engagement with the front face toward the rear face of the another termination block, the combined length of the front support members and the portions of the rear raised portions in engagement being sufficient to keep the front face from contacting the rear face of the another termination block, whereby damage to the screws is prevented during face to face shipment or storage of the termination blocks.

9. The termination block of claim 1 wherein the termination block base further includes rear raised portions positioned adjacent to the trace member portions of the plurality of circuit portions and extending from the rear face rearward beyond the trace member portions of the plurality of circuit portions with the trace member portions positioned therebetween.

10. The termination block of claim 1 further including a plurality of spaced apart channels at the rear face of the termination block base, each of the channels receiving a free end portion of one of the bent tine portions of the plurality of circuit portions.

11. The termination block of claim 1 wherein the bent tine portions of the plurality of circuit portions springably engage a portion of the rear face of the termination block base to generate a forwardly directed tension force.

12. The termination block of claim 11 further including a plurality of spaced apart channels at the rear face of the termination block base and wherein a free end portion of one of the bent tine portions is positioned in each of the channels.

13. The termination block of claim 1 further including a plug extending through the rear aperture of the rear face of the termination block base and within the interior space of the termination block base, and applying a forward force to the bent tine portions of the plurality of circuit portions to generate a forwardly directed tension force in the bent tine portions.

14. The termination block of claim 13 further including a plurality of spaced apart channels at the rear face of the termination block base, and wherein a free end portion of one of the bent tine portions is positioned in each of the channels.

15. The termination block of claim 1 wherein the contact end portion of each of the bent tine portions of the plurality of circuit portions has a flat forward facing contact surface with a coating of conductive metal thereon and the other portions of the contact end portion are uncoated.

16. The termination block of claim 1 arranged for carrying a mounting screw, the termination block further including a screw retainer extending rearward from the rear face of the termination block base and sized to removably retain the mounting screw.

17. The termination block of claim 16 for use with a wire cable having wires to be connected to the terminal connection portions of the plurality of circuit portions, the screw retainer being sized to retain the cable when the screw is removed therefrom to serve as a cable strain relief.

18. The termination block of claim 1 arranged for carrying first and second mounting screws, the termination block further including first and second screw retainers extending rearward from the rear face of the termination block base, each of the first and second screw retainers being sized to removably retain one of the first and second mounting screws.

19. The termination block of claim 18 mountable to a mounting member having first and second spaced apart mounting holes in the mounting member to receive the first and second mounting screws, respectively, inserted therethrough, the termination block base further including opposed first and second opposite sides positionable toward the first and second mounting holes in the mounting member, respectively, the first and second screw retainers being arranged to hold the first and second mounting screws with an orientation extending between the first and second sides of the termination block base.

20. The termination block of claim 19 for use with a wire cable having wires to be connected to the terminal connection portions of the plurality of circuit portions, at least one of the first and second screw retainers being sized to retain the cable when the screw is removed therefrom to serve as a cable strain relief.

21. The termination block of claim 20 for use with another termination block connected to another wire cable having wires to be connected to the terminal connection portions of the plurality of circuit portions of the another termination block, wherein the other one of the first and second screw retainers is sized to retain the another cable when the screw is removed therefrom to serve as a cable strain relief.

22. A termination block comprising:
a rear face with a rear aperture;

a front face with a front aperture, the front and rear faces being spaced apart;

a plurality of mounting surfaces on the rear face;

a plurality of screw receiving portions, each positioned at one of the mounting surfaces and having an opening and a screw receiver extending from the rear face toward the front face;

an interior recess between the rear and front faces and accessible from the rear face through the rear aperture and accessible from the front face through the front aperture;

a plurality of screws, each extending through the opening of one of the screw receiving portions and threadably received in the screw receiver thereof;

a plurality of terminal connection pads positioned at the rear face at one of the mounting surfaces, each terminal connection pad having a screw aperture therethrough positioned in alignment with the opening of the screw receiving portion positioned at the mounting surface and one of the screws extending through the screw aperture;

a plurality of tines extending through the rear aperture of the rear face and positioned within the interior recess and positioned for access through the front aperture, each tine having a contact end portion, the contact end portions of the tines being in spaced apart arrangement in position within the interior recess; and

a plurality of trace members positioned at the rear face, each trace member electrically coupling together one of the terminal connection pads and one of the tines.

23. The termination block of claim 22 wherein each of the plurality of screws has a head portion and the screw is threadably movable into the screw receiver of the screw receiving portion positioned at the mounting surface at which the terminal connection pad is positioned to hold the terminal connection pad secured to the rear face.

24. The termination block of claim 22 further including a plug extending through the rear aperture of the rear face and within the interior recess and holding the tines in spaced apart arrangement.

25. The termination block of claim 24 wherein the plug has a plurality of channels, each having one of the tines positioned therein.

26. The termination block of claim 25 wherein the plug holds the tines in spaced apart, generally planar arrangement.

27. The termination block of claim 24 wherein the plug has a cover portion extending over a portion of the rear face and covering at least a portion of the trace members.

28. The termination block of claim 22 further including at least one rear raised portion positioned adjacent to each of the terminal connection pads and extending from the rear face rearward beyond the adjacent terminal connection pad.

29. The termination block of claim 28 further including a plurality of forwardly projecting front support members, the front support members being positioned to engage at least a portion of the rear raised portions of another termination block when two termination blocks are positioned in engagement with the front face toward the rear face of the another termination block, the combined length of the front support members and the portions of the rear raised portions in engagement being sufficient to keep the front face from contacting the rear face of the another termination block, whereby damage to the screws is prevented during face to face shipment or storage of the termination blocks.

30. The termination block of claim 22 further including rear raised portions positioned adjacent to the trace members and extending from the rear face rearward beyond the trace members with the trace members positioned therebetween.

31. The termination block of claim 22 further including a plurality of spaced apart channels at the rear face, each of the channels receiving a free end portion of one of the tines.

32. The termination block of claim 22 wherein each of the tines springably engage a portion of the rear face to generate a forwardly directed tension force on the tine.

33. The termination block of claim 32 further including a plurality of spaced apart channels at the rear face and wherein a free end portion of one of the tines is positioned in each of the channels.

34. The termination block of claim 22 further including a plug extending through the rear aperture of the rear face and within the interior recess, the plug applying a forward force to the tines to generate a forwardly directed tension force in the tine.

35. The termination block of claim 34 further including a plurality of spaced apart channels at the rear face, and wherein a free end portion of one of the tines is positioned in each of the channels.

36. The termination block of claim 22 wherein the contact end portion of each of the tines has a flat forward facing contact surface with a coating of conductive metal thereon and the other portions of the contact end portion are uncoated.

37. The termination block of claim 22 arranged for carrying a mounting screw, the termination block further including a screw retainer extending rearward from the rear face and sized to removably retain the mounting screw.

38. The termination block of claim 37 for use with a wire cable having wires to be connected to the terminal connection pads, the screw retainer being sized to retain the cable when the mounting screw is removed therefrom to serve as a cable strain relief.

39. The termination block of claim 22 arranged for carrying first and second mounting screws, the termination block further including first and second screw retainers extending rearward from the rear face, each of the first and second screw retainers being sized to removably retain one of the first and second mounting screws.

40. The termination block of claim 39 wherein the first and second screw retainers are arranged to hold the first and second mounting screws in generally parallel orientation.

41. The termination block of claim 40 wherein the first and second screw retainers are sized to each retain a cable when the screw is removed therefrom to serve as a cable strain relief.

42. A termination block base for use with a plurality of screws, a plurality of wires, and a conductor having a plurality of terminal connection portions each configured to be in electrical contact with one of the plurality of wires held in place by one of the plurality of screws when assembled with the termination block base, a plurality of tine portions, and a plurality of trace member portions each coupled between one of the plurality of terminal connection portions and one of the plurality of tine portions, the termination block base comprising:

a rear face and a front face spaced apart from the rear face;
a plurality of screw receiving portions at the rear face sized to threadably receive one of the screws;

an interior recess between the rear and front faces, the interior recess being accessible from the rear face through a rear aperture and accessible from the front face through a front aperture through the front face, the interior recess shaped to receive the plurality of tine portions therein projecting through the rear aperture in position to be accessed from the front aperture; and

a plurality of mounting surfaces on the rear face each to support one of the plurality of terminal connection portions.

43. The termination block base of claim 42 further including a plug extending through the rear aperture of the rear face and within the interior recess and holding the plurality of tine portions therein in spaced apart arrangement.

44. The termination block base of claim 43 wherein the plug has a plurality of channels, each having one of the plurality of tine portions therein positioned therein.

45. The termination block base of claim 43 wherein the plug has a cover portion extending over a portion of the rear face to cover at least a portion of the trace member portions.

46. The termination block base of claim 42 further including at least one rear raised portion positioned adjacent to each of the plurality of terminal connection portions and extending from the rear face rearward beyond the adjacent terminal connection portion.

47. The termination block base of claim 42 further including a plurality of rear raised portions positioned adjacent to the plurality of trace member portions and extending from the rear face rearward beyond the plurality of trace member portions and arranged to position the trace member portions therebetween.

48. The termination block base of claim 42 for use with the plurality of tine portions each including a free end portion, the termination block base further including a plurality of spaced apart channels at the rear face, each of the channels arranged to receive the free end portion of one of the plurality of tine portions therein.

49. The termination block base of claim 42 arranged for carrying a mounting screw, the termination block base further including a screw retainer extending rearward from the rear face and sized to removably retain the mounting screw.

50. The termination block of claim 49 wherein the screw retainer is sized to retain a cable when the mounting screw is removed therefrom to serve as a cable strain relief.

51. A lead frame usable with a termination block base having a rear face with a rear aperture, a front face with a front aperture, the front and rear faces being spaced apart, an interior recess between the rear and front faces and accessible from the rear face through the rear aperture and accessible from the front face through the front aperture, and a plurality of mounting surfaces on the rear face, the lead frame comprising:

a lead frame of flat metal having a plurality of separate circuit portions sized for positioning at the rear face of the termination block base, each circuit portion including a terminal connection portion, a bent tine portion and a trace member portion of one-piece construction, the terminal connection portion being sized for positioning at one of the mounting surfaces of the termination block base, the bent tine portion being

sized for extending through the rear aperture of the rear face and positioning within the interior recess of the termination block base for access through the front aperture of the front face, and the trace member portion electrically coupling together the terminal connection portion and the bent tine portion.

52. The lead frame of claim 51 wherein the bent tine portions each have a contact end portion, the contact end portions of the bent tines portions being in spaced apart arrangement when positioned within the interior recess of the termination block base.

53. The lead frame of claim 51 for use with a plurality of screws, wherein terminal connection portion has an aperture therethrough sized to receive one of the screws.

54. A termination block comprising:

- a rear face with a rear aperture;

- a front face with a front aperture, the front and rear faces being spaced apart;

- a plurality of mounting surfaces on the rear face;

- an interior recess between the rear and front faces and accessible from the rear face through the rear aperture and accessible from the front face through the front aperture; and

- a plurality of separate circuit portions, each circuit portion including a terminal connection portion, a tine portion and a trace member portion of one-piece construction, the terminal connection portion being positioned at one of the mounting surfaces on the rear face, the tine portion extending through the rear aperture of the rear face and positioned within the interior recess and positioned therein for access through the front aperture of the front face, and the trace member portion electrically coupling together the terminal connection portion and the tine portion.

55. The termination block of claim 54 further including a plug extending through the rear aperture of the rear face and within the interior recess and holding the tine portions of the plurality of circuit portions in spaced apart arrangement.

56. The termination block of claim 55 wherein the plug has a plurality of channels, each having one of the tine portions positioned therein.

57. The termination block of claim 55 wherein the plug has a cover portion extending over a portion of the rear face and covering at least a portion of the trace member portions.

58. The termination block of claim 54 further including at least one rear raised portion positioned adjacent to each of the terminal connection portions and extending from the rear face rearward beyond the adjacent terminal connection portions.

59. The termination block of claim 58 further including a plurality of forwardly projecting front support members, the front support members being positioned to engage at least a portion of the rear raised portions of another termination block when two termination blocks are positioned in engagement with the front face toward the rear face of the another termination block, the combined length of the front support members and the portions of the rear raised portions in engagement being sufficient to keep the front face from contacting the rear face of the another termination block.

60. The termination block of claim 54 further including rear raised portions positioned adjacent to the trace member portions and extending from the rear face rearward beyond the trace member portions with the trace member portions positioned therebetween.

61. The termination block of claim 54 further including a plurality of spaced apart channels at the rear face, each of the channels receiving a free end portion of one of the tine portions.

62. The termination block of claim 54 wherein each of the tine portions includes a contact end portion positioned in the interior recess, each contact end portion having a flat forward facing contact surface with a coating of conductive metal thereon and the other portions of the contact end portion being uncoated.

63. The termination block of claim 54 arranged for carrying a mounting screw, the termination block further including a screw retainer extending rearward from the rear face and sized to removably retain the mounting screw.

64. The termination block of claim 63 for use with a wire cable having wires to be connected to the terminal connection pads, the screw retainer being sized to retain the cable when the mounting screw is removed therefrom to serve as a cable strain relief.